

VALUING PSYCHOLOGICAL OPERATIONS

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ABSTRACT

Psychological Operations - targeting not just the physical capabilities of an opponent but the psychological dimensions as well -- is a key military consideration. The direct and almost instantaneous communication available with today's technology provides an even greater potential for exploiting the vulnerabilities

and susceptibilities of the mind of the adversary. This effort develops a model for evaluating PSYOP products using multi-objective decision analysis and Value Focused Thinking. The model allows the Psychological Operations Detachment Commander to quantify the potential of proposed PSYOP products in meeting the psychological objectives.

VALUING PSYCHOLOGICAL OPERATIONS

Psychological operations (PSYOP) have been a key part of military operations since the dawn of conflict. The practice of targeting not just the physical capabilities of an adversary, but the psychological dimensions of the adversary has been, and continues to be, a key military consideration (Goldstein, 1999:5). The concepts of affecting an opponent's state of mind can be traced back to many early military strategists and writers. For example, Sun Tzu suggests

"if your opponent is of choleric temper, try to irritate him. If he is arrogant, try to encourage his egotism. If the enemy troops are well prepared after reorganization, try to wear them down. If they are united, try to sow dissension among them" -General Tao Hanzhang; translated by Yuan Shihing Sun Tzu *Art of War: The Modern Chinese Interpretations*

History is replete with examples where affecting the minds of the enemy's forces or those of one's own forces has changed the face of a battle, in some cases before the conflict was even engaged. Beating of chests (and later drums), was intended to frighten opposition forces while building courage in one's own force. The red cloaks of the Spartans inspired fear in the opposition at a distance, while masking the number of Spartan's wounded. The admonition of Spartan wives and mothers to their love ones to come home with their shields or on them motivated Spartan troops to fight on to victory while giving their enemies something to consider. Roman legions of the old republic were organized with the least experienced troops at the front of a formation, backed up by second ranks of older, seasoned troops to steady the line.

These older troops were often the older brothers, uncles, and fathers of the younger

troops in the front. Legion who wished to flee the first line of troops would have to retreat through the elders of their own family. The Iroquois are reputed to have created such fear in some tribes bordering the Iroquois Confederation that their neighbors would flee at the sight of a single Iroquois brave rather than chance an engagement that might bring the wrath of the entire Confederation. The affects of the "Rebel Yell" are well documented in the Civil War. The strictly military gains or losses of a Tet offensive may be balanced against the psychological affects gained by such actions.

The direct and instantaneous communication with the opposition made possible by today's technologies provides an even greater potential for exploiting the vulnerabilities and susceptibilities of the mind of the enemy. Today's news bears grim witness to the importance of psychological warfare in modern military operations. Their effects on troops, allies, governments, and populations should not be underestimated.

While PSYOP are not new, a key to their use is to incorporate them in an overall campaign in order to have the maximum impact for success. Modern PSYOP planning, in executing a commander's objectives, generally starts with the identification of the potential target audience. The target audiences are analyzed for potential vulnerabilities. These audiences and vulnerabilities are then analyzed for their potential impact on the objectives (Goldstein, 1999:11). Leveraging the effects of PSYOP in conflict is vital. There have, however, been no structured ways to measure and quantify those effects. This study provides measures of merit for PSYOP against opposition forces. Value Focused Thinking (VFT) is used in this research to evaluate PSYOP courses of

action. Courses of action in the world of PSYOP are known as products.

After a brief background discussion, the remainder of this paper is organized into four sections. The first section describes the development of the value model quantifying the consistency of PSYOP products with the commander's objectives. The second section describes a scenario in which several PSYOP products are developed and then evaluated. An example analysis of these PSYOP products in the third section shows the usefulness of the model. The concluding section briefly summarizes the effort and makes recommendations for future work.

Background

A vast array of literature in military operations and affairs, psychology, communications, sociology, anthropology, political science and marketing apply to the questions of PSYOP. (See Barucky, Connell and Karabaich, 1998 and Goldstein, 1996 for summaries of related literature.) For brevity, however, we focus the discussion in this section on developing a value model of PSYOP for US forces against the opposition.

The primary methodology used to develop measures of merit for PSYOP against the opposition comes from VFT and multi-attribute utility theory (Keeney, 1992; Keeney and Raiffa, 1976). There are several steps in applying VFT to any decision resulting in a value-oriented, fully quantified value model. The VFT process starts by identifying the decision-maker's values, followed by constructing an objectives hierarchy, identifying returns-to-scale for each objective or sub-objective, and weighting the objectives in the hierarchy. The value model greatly assists the analyst in creating and scoring alternatives, analyzing the alternatives, and providing insight and recommendations to the commander.

Capturing the Decision-Maker's Values

A value model is a structured way of capturing, in first qualitative and then quantitative terms, the important concerns, or values, of a decision situation. Identifying the appropriate decision-maker or critical stakeholders is crucial in driving which values are to be considered. We decided that the true decision-maker for this effort would be the PSYOP Detachment Commander for the theater of operations. We were able to obtain preferences and values from a person experienced in such a position. The methodology for building the value hierarchy should vary according to who is actually available for eliciting values and what documents are also available (Parnell, et al., 1997:286-289). Because doctrinal manuals were available and only the decision-makers' representatives were available for the study, we began by looking for a "Gold Standard" in military doctrine to build and support our value structure.

Doctrine-Based Hierarchy for PSYOP against the Opposition

The United States military has at least four documents (Joint Publication 3-53, Army Field Manual 33-1, Army Field Manual 33-1-1, and Air Force Doctrine Document 2-5.5) dedicated to the discussion of PSYOP. These documents are either directive or suggestive in nature and prescribe how and why PSYOP should be done. Of particular interest in this analysis was the detailed lists of objectives for PSYOP at all levels of warfare as well as the specific definition of a PSYOP. Based on a review of these documents, the top tier of the hierarchy was determined by the definition of PSYOP.

"Psychological operations (PSYOP) are operations planned to convey selected information and indicators to foreign audiences to

influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, and individuals” (JP 3-53:I-1)

Doctrine identified several key areas for the application of PSYOP. This study focused on PSYOP directed against the opposition. The top-level objective for PSYOP, with a focus on the opposition, is to *modify the attitudes and/or behaviors of the opposition*. For the purposes of this study the term opposition designates a politico-military organization or nation-state whose stated objectives are opposed to those of the United States and its allies. Synthesizing the objectives for opposition PSYOP from the four doctrinal manuals, a mutually exclusive and collectively exhaustive set of objectives was created. These were reviewed with domain experts in PSYOP to develop the second level of the value hierarchy. These two top levels are presented in Figure 1. A broader based hierarchy of objectives was derived from doctrine; however, many of the other objectives are outside the scope of this work or inappropriate for discussion in this forum. This study therefore focuses on PSYOP against opposition forces.

This hierarchy was reviewed by an array of decision-maker approved PSYOP experts. The experts had varying levels of expertise and experiences ranging from senior level decision-makers to experienced PSYOP operators in the Air Intelligence Agency and the Joint Command and Control Warfare Center. Some of these individuals had experience in the 4th Psychological Operations Group (4th POG), both as team members and instructors. In addition, the objectives’ hierarchy was briefed to the Air Force PSYOP Working Group for their review and insights.

Expert-Based Breakdown for Measures

The team of experts, stakeholders, and analysts agreed that measures could not be established for the elements of these top two levels (Figure 1). A further breakdown of each objective was necessary.

US Army Field Manual 33-1-1 was used as a starting point for identifying those concepts that are important to consider under each objective in the second level of the hierarchy. FM 33-1-1 is the primary doctrinal document discussing many of the finer details in developing specific products for PSYOP. Figure 2, expanding the second level objective, *reduce efficiency of forces*, contains the results of synthesizing this manual’s suggestions and the team experts’ inputs into a mutually exclusive and collectively exhaustive hierarchy for each objective.

The team approved the same breakdown underneath *each of the eight objectives* in second level. The breakdown from this point begins with two concepts called *medium* and *message*.

The *medium* is defined as the form of transmission of the product to the target audience. In other words, it is the method selected for transporting the product and its information to the audience; the channel used to communicate to the target audience.

The *message* is a more theoretical concept and is defined as the intended semantic meaning contained in the information of the product.

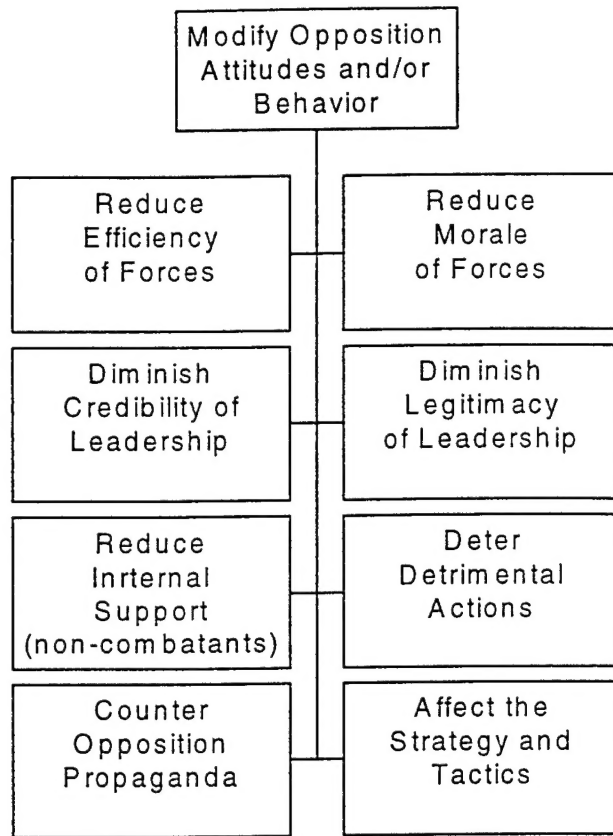


Figure 1. Top Two Levels of Objectives Hierarchy

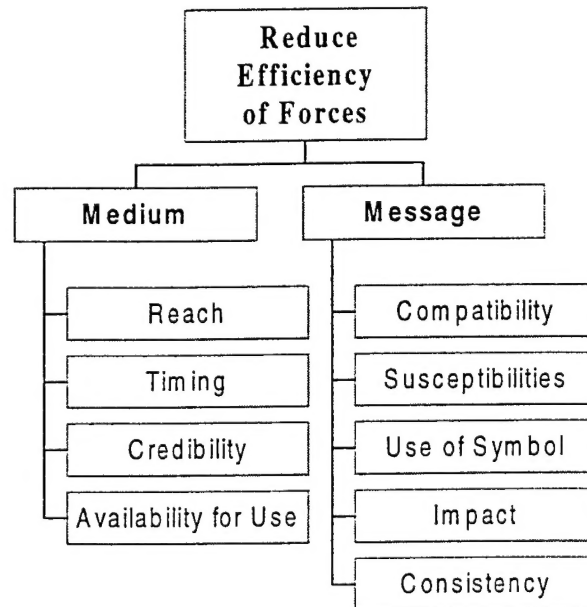


Figure 2. Breakdown of Hierarchy under Level Two Objectives

To develop measurable quantities for the concepts of medium and message, further breakdown was required.

Medium

Medium is broken down into the objectives of *reach*, *timing*, *credibility*, and *availability for use*. These objectives were identified by experts and supported by doctrine, specifically US Army FM 33-1-1.

Reach is the ability of the medium to contact the target audience. This concept was limited to only contact or exposure with the product. There is no assumption that the audience understands or assesses the product. Reach is simply concerned with getting the product to the target audience.

Timing is the ability of the medium to present the information at the "right" time. The "right" time varies based on when the target audience is susceptible to the information contained in the product. There exists a window of susceptibility for a particular target audience in which there is believed to be a predisposed susceptibility to the information. A product that contains a good timing for the medium would present the information during as much of this window as possible.

Credibility is the trustworthiness and expertise of the physical medium, presenter, and/or author. Trustworthiness deals with the perceived tendency of the medium, presenter, and/or author of the information to tell the truth. The expertise is focused on the perceived likelihood that the presenter and/or author is believed to know the truth.

Availability for use refers to the available channels for use by friendly forces. Channels are the ways in which information can be transmitted. This concept deals with the different types of media that the friendly force can use, ranging from print media to video. It is assumed that the more channels used by a product the better.

Message

The important objectives of message are *compatibility*, *susceptibilities*, *use of symbol*, *impact*, and *consistency*. Developing a detailed understanding of each of these concepts required a great deal of discussion and definition before measures could be built.

Compatibility is the coverage of the approved themes for the PSYOP objective. The PSYOP objectives used by this study are those identified by the second level of the hierarchy (internal support, efficiency of forces, credibility of leadership, legitimacy of leadership, strategy and tactics, opposition propaganda, morale of forces, and detrimental actions).

Susceptibilities, the next objective for "Message," are the degree to which the target audience's vulnerabilities can be used to further the PSYOP objective. The vulnerabilities are the important conditions in the target audience's life that will generate a response. The predisposition of the audience to act in a manner suggested by the PSYOP product is a key concern in determining the target audience's degree of susceptibility. For example, a target audience that is hungry and without the capability to obtain its own food would be susceptible to an argument that uses the replenishment of their food supply.

A *symbol* is something that stands for, suggests, or evokes feeling or emotions that support the themes. Symbols can be anything from the type set used in a printed product to highly conceptual graphics or cultural icons. Symbols are used because they persuade by using already pre-established connections within the target audience. A drawback of a symbol is that it can be associated with many topics, not all of which may make the product more effective. Some examples of symbols are national flags, cultural icons, and even the letter is used in forming words.

The *impact* of the message is the degree of retention of the intended message. This concept evolved from a lengthy discussion among those involved in generating the hierarchy. In general, messages that contain and rely on more emotional content tend to have a higher impact and are remembered more easily and for a longer period.

The final objective of the message is *consistency*. The consistency of the message is the support the message provides with the overall effort. PSYOP products, to the greatest extent possible, should support not only our other PSYOP products, but also the actions taken by friendly forces. For example, a message "resistance is futile" would be undercut by the use of a symbol that evokes a cultural memory of an Alamo, Masada or Camerone-like defense. While the intended message is "defeat is inevitable," the symbol encourages a "death before dishonor" mind set in the opposition. An inconsistent message has been sent.

The experts pointed out that the objectives discussed above, while capturing the intent of doctrine, do not describe the way PSYOP courses of action – or products – are created by PSYOP personnel. The current process involves taking the commander's strategic objectives and having a knowledgeable and creative staff design PSYOP objectives that are tailored to evoke specific behaviors from a target audience. The PSYOP objectives are analyzed to find appropriate themes that support the attainment of the PSYOP objectives. The commander then approves these themes and products are developed to support these themes. There is normally no quantitative evaluation of alternative products and the value of the products is in their support of a single specific theme, not of the higher level PSYOP objectives.

Evaluating alternative products using the PSYOP value model requires an analyst to determine which of the PSYOP objectives is supported by each of the approved themes. It is important to note that one theme may support multiple objectives in the hierarchy. Therefore, there is no requirement for a non-redundant division of the themes. For example, an approved theme such as "Coalition forces have superior supplies, equipment, and training" may be identified by PSYOP analysts as supporting the PSYOP objectives of *morale of force*, *counter-propaganda*, and *strategy and tactics*. A product can be evaluated using the sub-hierarchy under each applicable PSYOP objective. The critical switch in thinking is that a product may contribute to multiple PSYOP objectives, which gives the overall analysis a much more holistic approach.

The total hierarchy is illustrated in Figure 3 and results in 72 evaluation measures.

The Cost of PSYOP Products

The hierarchy discussed so far captures the benefits that a PSYOP product can produce. In addition to financial costs, PSYOP planners must consider such intangibles as *force protection*, *exploitation potential*, and *security*. A hierarchy was also developed to capture the "cost" of a PSYOP product. The "cost" hierarchy is presented in Figure 4.

Underneath the global objective of minimize the "cost" of PSYOP are the four subobjectives; *exploitation potential*, *force protection*, *prevent disclosure of critical capabilities*, and *use of critical resources*.

Exploitation potential is the potential that the opposition could use a PSYOP product in a manner against our objectives, in a political or propaganda sense. *Force*

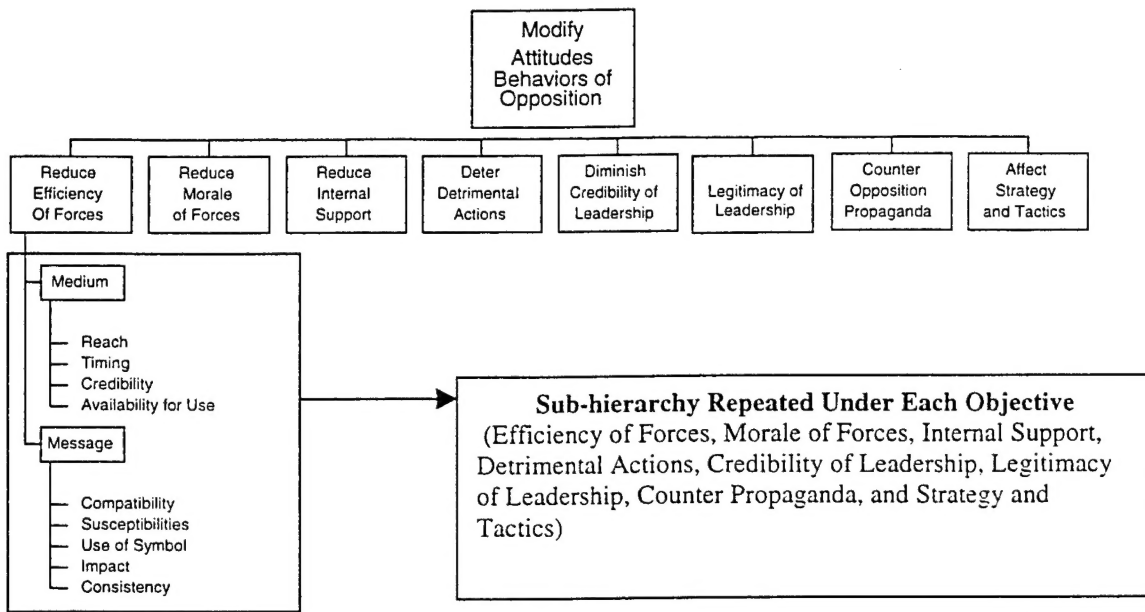


Figure 3. Total Objectives Hierarchy of Opposition PSYOP

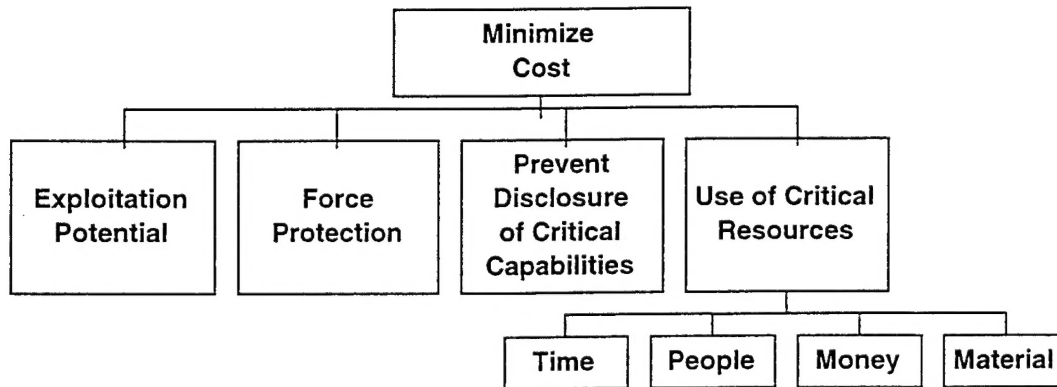


Figure 4. PSYOP Cost Hierarchy

protection is the desire to minimize the number of friendly forces put in harm's way. *Prevent disclosure of critical capabilities* is defined as not providing information to the opposition that they could use against our forces. For example, warning the opposition that an attack is imminent may have a beneficial psychological effect; however, the opposition now knows an attack is imminent and may strengthen their defenses, *critical resources* refer to resources of a unique nature that have a potential use or opportunity cost associated with them; if committed to a particular product or action, then critical resources are not available for other uses for the duration of the commitment. The objective is to minimize their expenditure during a PSYOP. The subobjectives of *use of critical resources* are broken down into *time, money, people, and material*.

The Cost hierarchy was considered by several of the experts to be a key contribution of this study. In practice, PSYOP planners spend a great deal of time on the potential benefits of their products and not the drawbacks of those products. Explicitly stating the "costs" of PSYOP brings to light some of the most important aspects of PSYOP planning.

Measure Identification and Single Dimension Value Function Development

The next step was to develop measurable quantities or evaluation measures for the lowest level of both hierarchies. The team developed each of the objectives and subobjectives until applicable measurable quantities, i.e. evaluation measures, could be identified or constructed for each of the lowest level objectives of the hierarchy.

A single dimensional value function was developed for each of the identified measures. The single dimensional value function serves the purpose of capturing, for different levels of each measure, the returns-

to-scale (Kirkwood, 1997:60). The single dimensional value functions also facilitate, along with weights, the development of an overall multi-objective value function (Kirkwood, 1997:61).

A scale from 0 to 1 was used. Zero represents the lowest value associated with a particular level of a measure and one represents the most value for a particular level of an evaluation measure. We used two forms that are used in most applications: piecewise linear and exponential forms (Kirkwood, 1997:61). Tables 1 and 2 summarize the single dimensional value functions used in this study. A more detailed discussion of the specific single dimensional value functions elicited for the measures is presented in Kerchner (1999).

Forming the Multi-objective Value Function

The value function combines the single dimensional value functions in a fashion that captures the decision-maker's preferences. The analysis has assumed mutual preferential independence. This assumption implies that an additive value function is appropriate for the overall value function (Kirkwood, 1997:238-239). The form of the function is presented in Equation 1.

$$v(x) = \sum_{i=1}^n w_i * v_i(x_i)$$

Equation 1. Kirkwood Additive Value Function, (Kirkwood, 1997:230).

In Equation 1, $v_i(x_i)$ represents the single dimensional value functions for each measure. The w_i 's are the weights for each measure and are normalized to sum to one.

During the development of the single dimensional value functions, the experts noted that certain measures had "global" constraints. A "global" constraint is a

Table 1. Evaluation Measures Used to Evaluate PSYOP Products

Level 3 Objective	Level 4 Objective	Measure (X axis)	Shape of Function	Highest Value	Least Value
Medium	Reach	Expected % of Tgt Audience Exposed	S-shaped, increasing	100%	0%
Medium	Timing	% of Susceptibility Window Used	S-shaped increasing	100%	0%
Medium	Credibility	% of TA that Believes Source	Linear increasing	100%	0%
Medium	Availability for Use	# of Categories Used	Discrete increasing	3	0
Message	Compatibility	% of Approved Themes	Linear increasing	100%	0%
Message	Susceptibility	Constructed Susceptibility Category	Increasing	High	Low
Message	Symbol	% of Tgt Aud Perceives Symbol Correctly	Linear increasing	100%	25%
Message	Impact	# of Exposures until Retention	Exponential decreasing	1	6 or more
Message	Consistency	Subjective Determination	Binary	Consistent	Inconsistent

Table 2. Evaluation Measures Used to Evaluate PSYOP Costs

Cost Objective	Cost SubObjective	Measure (X axis)	Shape of Function	Highest Value	Least Value
Exploitation Potential	N/A	Recoverability	Constructed	None	High
Force Protection	N/A	% of Engaged Forces Lost	Piecewise Linear Decreasing	0%	30%
Disclosure of Critical Capabilities	N/A	Probability of Disclosure	Exponential Decreasing	0%	100%
Use of Critical Resources	Time	Production Time (Weeks)	Linear Decreasing	0 Weeks	2 Weeks
Use of Critical Resources	People	% of Available Forces Used	S-shaped Decreasing	0%	100%
Use of Critical Resources	Money	% of Available Funds	Linear Decreasing	0%	100%
Use of Critical Resources	Material	% of Max Cycle Time	Linear Decreasing	0%	100%

constraint that, when violated, drives the total value achieved by a product for a *specific PSYOP Objective* to zero. The existence of global constraints required modification of the overall value function to reflect these constraints. We used multiplicative indicator variables, I_i , for each measure that had a “global” constraint – a threshold level – below which the overall multi-objective value should be zero. The complete multi-objective value function for a given PSYOP product is presented in Equation 2. The function $v(x)$ in Equation 2 is the multi-objective additive value function from Equation 1.

$$v_{\text{mod}}(x) = v(x) * \prod_{i=1}^n I_i$$

Equation 2. Modified Overall Value Function

The modification of the value function captures the experts’ consensus about the “global” constraints, while maintaining the theoretical basis of the additive value model. The multiplicative terms capture the constraint set by the nature of multiplication. The indicator variables take on a value of one when the constraint is not violated and zero otherwise. The only way that the modified value function can return any value is if all the “global” constraints are satisfied. When all of the constraints are satisfied, the preference structure is adequately approximated by the additive value function.

The measures for the objectives of *reach*, *availability for use*, *compatibility*, and *symbol* were identified to have “global” constraints. A good example of a threshold that may move depending upon the scenario or the decision-maker is the measure applied to the objective *symbol*. The elicited scoring function is presented in Figure 5. The point represented by 25% is a threshold for value.

A course of action scoring below this threshold would get a value of zero. The dashed line indicates that the underlying function is a straight line. The threshold only sets the point where value begins to be non-zero and any higher percentage is assigned value based on the linear function.

The operational significance in providing for the positioning of the threshold is that with one question to the decision-maker, the threshold can be established without re-eliciting the entire value function, and with four questions posed, the entire multi-attribute value function becomes operationally valid for a new scenario.

Weighting the Value Function

The weights for the returns to scale need to be determined to finish the overall value function. The procedure for eliciting the weights starts with asking the decision-maker or experts to consider the increments in value that would occur when going from the least preferred level of a measure to the most preferred level of a measure for all the measures, while holding the other measures at their lowest level above a constraint. The measures are then rank-ordered based on the value increments. Each measure’s weight is then scaled based on multiples of the smallest value increment measure. This will form a system of equations and along with the requirement that all the weights must sum to 1, the weights can be calculated (Kirkwood, 1997:70). This procedure can be difficult to communicate, so an alternative procedure was used in conjunction with the preferred method. The method involved the direct assessment of the weights. The decision-maker allocated the percentage of value for the concepts identified at each level of the hierarchy. These weights were based on the particular test scenario used to test the model. The actual weight assessment began with

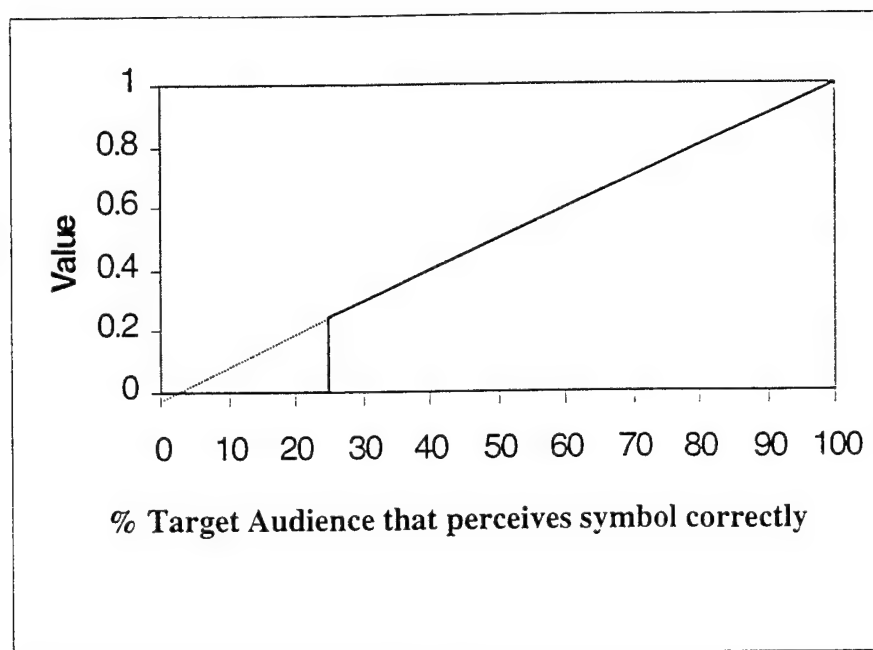


Figure 5. Example Of A Threshold That May Change With The Scenario

attempting to use the preferred method of obtaining the weights based on multiples of the least important measure. The direct assessment procedure was used to collect the weights.

Scoring a Set of PSYOP Products

An illustrative example of using the hierarchy is presented in this section. To illustrate the approach, five products developed by recent graduates of the Psychological Operations Officer's Course (POOC) developed as part of their studies were used for the scenario. (The POOC is an Army run school for training personnel in the tactics and techniques of PSYOP.) Modifications of the products were made on a case by case basis in order to facilitate the illustration

Several PSYOP experts familiar with the notional scenario did the scoring effort over a period of three days. They scored three of the products under the objective of internal support and two others under all eight fundamental objectives. The team

provided a minimum score, most likely score, and maximum score for each evaluation measure and product. The purpose of this was to capture the potential uncertainty in the scores.

The Cortina Scenario

Cortina is a notional scenario used by the POOC in support of teaching officers the fundamentals of PSYOP and at the Joint Readiness Training Center (JRTC) during exercises. It was the scenario for which the five products were developed

In the scenario United States and Allied forces are being deployed to Cortina, a fictional host nation. There is an insurgent political force opposing the current democratic government of Cortina. The insurgent crisis is best described as a multi-polar environment, dominated by a socialist-inspired faction that is the primary threat to the existing Cortinian government. The current phase of the campaign is assumed to be Phase 2. Phase 2 starts at the time that United States forces are being deployed and

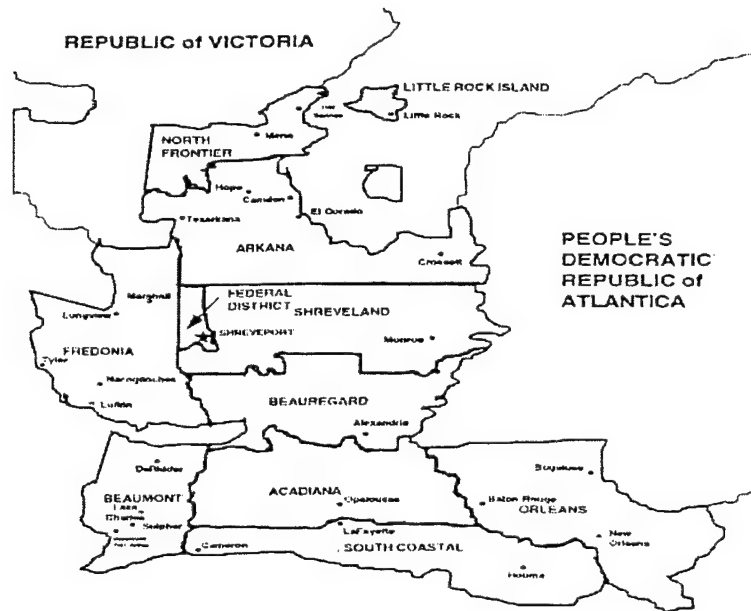


Figure 6. Map of Cortina Region

ends at the beginning of open hostilities. This phase of operation was used by the decision-maker as a basis for applying importance to different objectives. The phase determines what capabilities the United States forces will have. A map of Cortina and the surrounding environment is presented in Figure 6.

The principle protagonists and groups in the scenario are the United States, the Cortinian people, the Cortinian Liberation Force (CLF), the Government of Cortina (GOC) and the People's Democratic Republic of Atlantica (PDRA). The CLF is an insurgent force comprised of Cortinian nationals who are dedicated to overthrowing the current government of Cortina. The current Cortinian government is democratic, while the CLF endorses replacing the GOC with a communistic form of government.

The CLF is supported by the PDRA. The PDRA is a communist nation with goals of expanding its form of government. The primary religious belief of the Cortinian is Judeo-Christian. The Cortinian population is principally comprised of Caucasians and African decents. In general, Cortina has a high unemployment rate (12.5%), increasing crime rate, a slumping economy and an increasing number of CLF terrorist-style attacks. There will be some opposition in the United Nations to military actions by the United States. Of supreme importance is that the PDRA has a history of using weapons of mass destruction. A more detailed description is not necessary for the illustration of the approach.

The five products used in this study are outlined below. A more detailed description of each product is provided in Appendix A.

The *Snake in the Garden Leaflet* is a leaflet whose message is that the United States and the GOC are allies that want what is best for Cortina and its people. The target audience is the civilians of Cortina that are predisposed to be sympathetic to the CLF. National Symbols are used.

The *Snake in the Garden Broadcast* is a local radio broadcast that verbally describes the leaflet. This broadcast has the same target audience, symbol, and message as the leaflet.

The *Red Autumn Broadcast* is also a local radio broadcast. The intended message is that the CLF is a threat to the Cortinian heritage and nation. The target audience is CLF sympathizers. The symbol, Red Autumn, was a massacre of innocent civilians by the CLF. It demonstrates that the CLF is a threat and is not fit to lead Cortina.

The fourth product is the *1-800 Squeal* which is a loud speaker broadcast. Standard vehicle mounted loud speaker systems are used to transmit a series of three messages, progressively detailed, in the areas where CLF supporters are thought to be living. Citizens are encouraged to call an 800 number and report CLF activity.

The final product, a poster termed *Voucher*, focuses on the CLF's practice of issuing vouchers for food received or taken from the people. The vouchers are to be redeemed when the current government of Cortina is overthrown and the CLF is in power. The poster pictures a family at their evening meal with plates of vouchers instead of food. Written on the poster is the message that you cannot eat paper.

Theme Linkage – A Change in Thinking

The use of the model to evaluate the products required a change in thinking about why a certain product should be used, as opposed to why it was developed. The standard practice for developing products is

to select a particular theme and target audience. Products are discussed and evaluated in this manner, focusing only on the specific target audience and theme. The PSYOP hierarchy recognizes that a product, while developed for a specific purpose, may in fact support objectives beyond its intended purpose and target. The bridge between these two schools of thought is a linkage between the commander's approved themes and their support of the eight PSYOP objectives contained in the hierarchy.

The Cortina scenario contains twenty-five approved PSYOP themes for interagency use in the region. The themes are listed in Table 3. The current practice of product development and evaluation begins with considering approaches to support these themes and selecting particular target audiences, which are felt to be susceptible to the particular theme. Products are then proposed that are appropriate for that target audience and compatible with one specific theme.

The PSYOP value model has contained within it a compatibility measure of approved themes supported. This implies that only the themes that support the particular objective should be considered. The expert scorers designated which of the commander's themes supported the eight different objectives in the opposition PSYOP hierarchy. The last link needed before a product could be scored is the identification of which themes the products supported. The process followed by the experts started with identifying, for all 25 commander's themes, the objectives that each product supports. The second and final step in the process was to have the experts designate all the commander's themes that each product used or supported. This allowed the experts to show what products supported which themes and subsequently which objectives they support. Table 4

Table 3. Approved Themes for Cortina Scenario

ID	Theme
A	The US remains committed to ensuring the stability and security of the region. Friends helping friends
B	When the PDRA aggression is stopped, the enlarged US military presence will be reduced quickly to pre-hostility levels
C	The Cortinian Government is duly elected and legitimate.
D	The Cortinian Government is concerned for the safety of the Cortinian Citizens; The CLF is not.
E	The Cortinian military, paramilitary, and law enforcement agencies care about the Cortinian people.
F	The CLF will eventually lose and be punished.
G	Coalition forces will treat captured CLF members fairly and humanely.
H	CLF operations are illegal and illegitimate.
I	The local populace is hostile towards the CLF
J	Coalition forces have superior supplies, equipment, and training.
K	CLF Forces are under equipped, poorly trained, and poorly supplied.
L	The PDRA will lose and suffer humiliation.
M	Coalition forces are heavily protected and will respond to threats with force.
N	Cooperation with coalition forces will result in long term stability and prosperity for Cortina.
O	Coalition forces are concerned for the safety of the civilian population.
P	Cortinians have worked to build a country that represents the voice of its people. By resisting the CLF you guarantee and protect your rights and your homeland.
Q	If you report insurgent activity to the JTF or GOC officials, then the security and safety of the Cortinian people can be assured.
R	The PDRA is a communist regime that prevents its citizens from practicing its faith. If you do not support the GOC the insurgency will prevail.
S	Remaining calm and cooperative during this neo ensures your safety and the safety of those being evacuated.
T	Actions of the CLF have brought this fighting and danger to your community.
U	CLF endangers your life and the lives of loved ones.
V	You will be sacrificed by your leaders to ensure their personal power within the CLF.
W	If you surrender you will be treated honorably and provided with food, water, shelter, and the necessary medical attention.
X	Do your part to support Cortina; Identify CLF weapon caches.
Y	A decisive victory has been won by your Cortinian armed forces, enabling the eradication of the CLF.

Table 4. Product and Theme Linkage for Cortina

Product						PSYOP Opposition Objectives							
Snake In Garden Leaflet	Snake In Garden BroadCast	Red Autumn	1-800 Squeal	Voucher	Approved Theme	Efficiency of Forces	Morale of Forces	Credibility of Leadership	Legitimacy of Leadership	Internal Support	Counter Propaganda	Detrimental Actions	Strategy and Tactics
*	*		*		A								
					B								
			*		C			X	X				
		*	*		D				X	X			
			*		E								
					F		X	X				X	
					G		X				X		
		*	*		H			X	X				
		*		*	I		X			X	X		X
*	*				J		X				X		X
					K		X			X			X
*	*				L			X		X	X		
					M							X	X
*	*	*	*		N			X		X	X		
			*		O					X	X		
		*	*		P					X			
		*	*		Q					X		X	
					R			X	X		X		
					S								
		*			T								
		*	*		U		X						
					V		X	X					
					W								X
		*	*		X	X							X
					Y								

* indicates support of approved themes by a product.

X indicates support of a PSYOP Objective by an approved theme

P, Q, T, U, and X. Table 4 also shows that the commander's theme I supports the hierarchy objectives of *reduce morale of forces, reduce internal support, counter opposition propaganda, and affect strategy and tactics*. This requirement for scoring products, based on the Opposition PSYOP value model developed, showed that the experts believed products could and should be evaluated based on what they *can achieve* and not what a product was specifically designed for.

The Scoring Process

Two experts familiar with Cortina and PSYOP participated as the scorers. The first expert has over ten years of experience in PSYOP and participates regularly in high profile exercises and actions as the PSYOP expert. The second expert has recently graduated from the POOC and has a background in behavior science.

For every measure and product, three scores were gathered. The low score represents the lowest realistic estimate for a product on a particular measure. The most likely score represents the experts' assessment of the best estimate of the score. The high score represents the highest realistic estimate assessed by the scorers. In the cases where there was disagreement between the two scores, the scorers deferred to the estimate of the more experience person. This resulted in a total of 240 evaluation to support the analysis of all five products under the objective of internal support. An additional 378 evaluations were collected to facilitate the analysis of Red Autumn and Voucher under all eight objectives of the hierarchy.

Internal Support Analysis

The analysis of products would generally use the entire hierarchy for evaluative purposes. However, the typical view of PSYOP products supporting one

theme for one target audience suggested that an initial analysis be done in this same vein. This analysis was completed to mimic the current practices and determine the model's ability to help support the way decisions are currently being made. The benefits of the Opposition PSYOP value model is shown by analyzing all five products under the hierarchy's PSYOP objective of Internal Support. This portion of the hierarchy is shown in Figure 5 along with its weights. Internal Support was chosen because, in retrospect, the experts felt that the five products were designed with that objective as their primary focus.

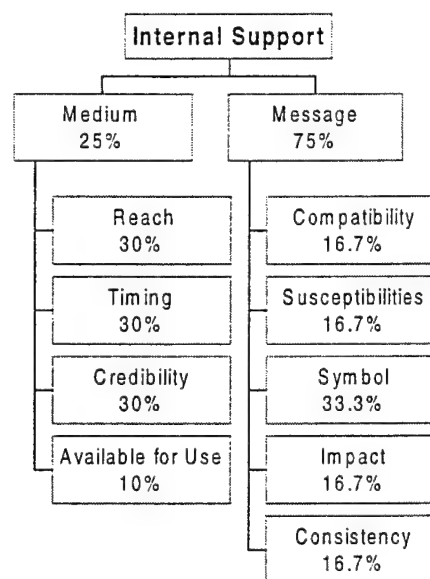


Figure 5. Internal Support Value Hierarchy with Weights

The first part of the analysis looks at the five products' benefits as shown by their multi-attribute value. Figure 6 shows that according to the most likely scores, Red Autumn is the most preferred product. It is obvious that Red Autumn's strong message content for supporting the objective of internal support is highly valued. The second most preferred product is the Snake in the Garden Leaflet. The leaflet's message was less valuable; however, its medium was

slightly more valuable than other products. This value pushed the leaflet to the front of the four remaining products.

Figure 6 also allows a comparison of the Snake in the Garden leaflet and Radio Broadcast. These two products were chosen for analysis because the only real difference between the two is the choice of medium. The symbols and themes were intentionally maintained the same. The medium of a radio broadcast is less valued than the leaflets. A detailed analysis of these scores (Kerchner (1999)) shows that the radio broadcast has higher credibility. However, it does not reach as much of the target audience and uses less of the window of susceptibility. For Cortina and these two products, this tradeoff between credibility and getting the message to the audience at the right time for these two products weighs in favor of the leaflet. It is more important to get the message to more of the audience at the right time, than to have a medium that is more credible. There is also a change in the value of the message caused by changing the medium. The scorers pointed out the difficulty in building a mental picture of the leaflet with words. This accounts for the slight decrease in value for the message of the radio broadcast.

Sensitivity Analysis for Reduce Internal Support Option

A question that arises when using a value model is how important are the weights in determining the rank ordering of the alternatives. The local weights of medium and message are the first weights explored. Figure 7 shows how the rank ordering of the products changes when the medium weight is varied from 0 to 1. The model is fairly insensitive to the weight assigned to the medium. The weight will have to increase from 25% to over 55.5% before Red Autumn ceases to be the top-ranked product. This change represents a

change of more than double the current weight. In this case, the Snake in the Garden Leaflet would then be the most preferred product, based on the Opposition PSYOP value model. Because this upper level weight did not have a significant impact on the rank order, the lower tier weights will most likely not have an impact either and do not need to be investigated further.

A simple review of the value of the products provides only a narrow perspective of the power of the Opposition PSYOP value model developed. The model also includes a multi-attribute cost function. Figure 8 presents the results of the value scores plotted against the cost for all five products. The boxes were generated using the minimum and maximum scores. The symbols represent the most likely score for the products. Red Autumn maintains the highest value, with the Snake in the Garden Leaflet coming in second. This rank ordering stayed the same in the value-only analysis because it uses the same scores. The addition of the cost axis to the analysis shows that the Snake Leaflet has the lowest cost. However, the boxes for Red Autumn and the Snake Leaflet overlap. This implies that a decision-maker would have to make an explicit tradeoff between the benefits and costs of choosing one of the top two products.

The comparison of the *1-800 Squeal* product and the Snake in the Garden Radio Broadcast is an interesting analysis highlighted by Figure 8. The boxes for these two products overlap a great deal. This implies that the two are very close in value and cost. The only difference between the two is that the Snake in the Garden may have the possibility of costing as little as the top two alternatives. In addition, the *1-800 Squeal* product is dominated by the Red Autumn product. Red Autumn provides

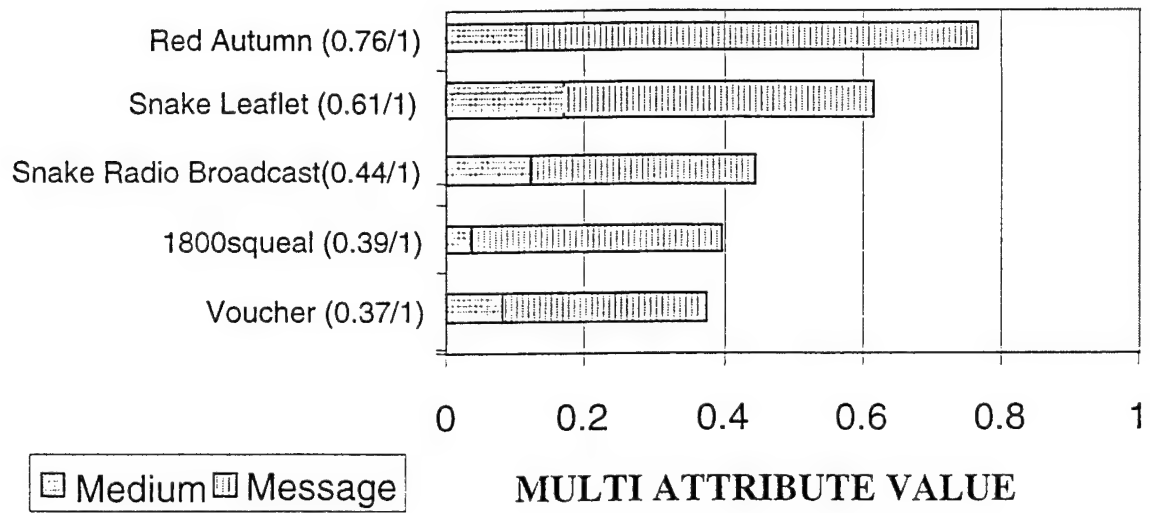


Figure 6. Multi-attribute Value of the Five Products

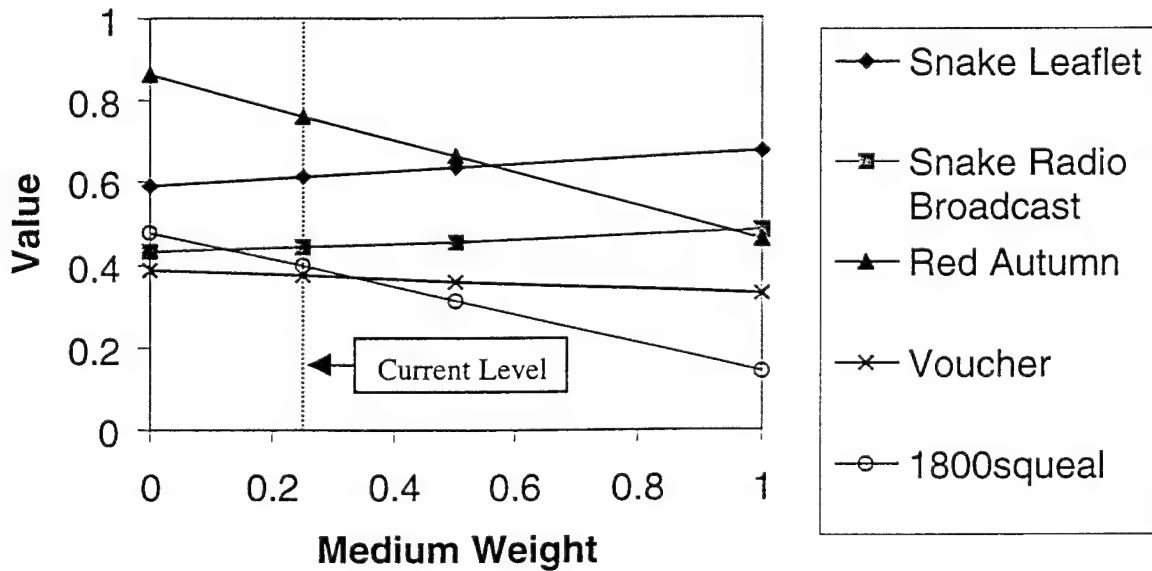


Figure 7. Sensitivity of the Medium Weight

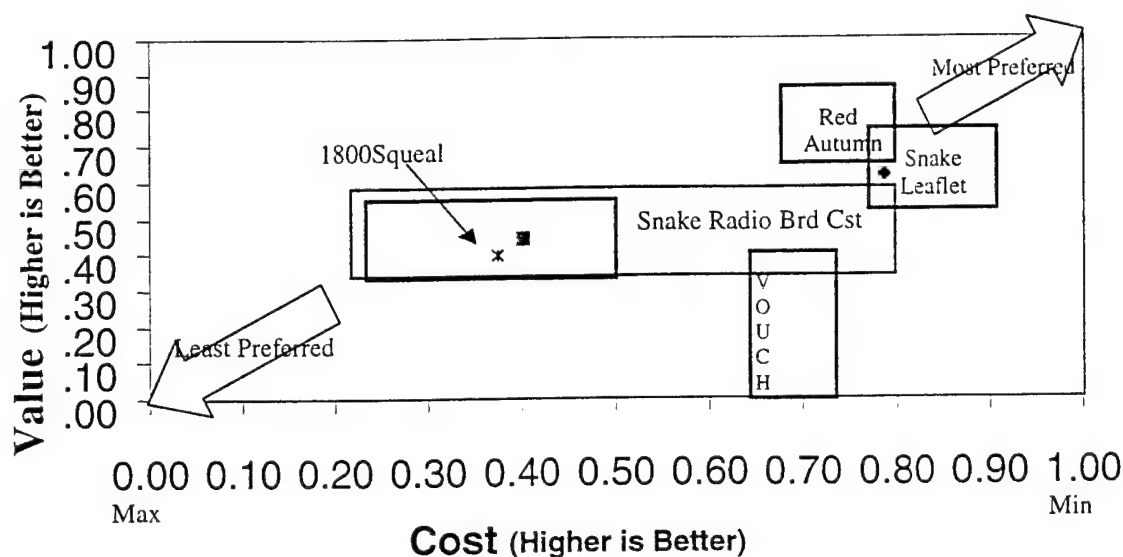


Figure 8. Value vs. Cost for Internal Support

more benefit, or value, for less cost, in all cases, than *1-800 Squeal*. In other words, Red Autumn's minimum expected benefit is greater than *1-800 Squeal*'s maximum expected benefit, at a lower cost. Red Autumn should be chosen over *1-800 Squeal*.

The Voucher product box illustrates a unique characteristic of the model. As one can see in Figure 8, the value for Voucher could be as little as zero. This does not imply that the voucher scored at the minimum for all the measures. However, Voucher violated a "global" constraint in its minimum score for the symbol used. The evaluators felt that the symbol could be interpreted so many ways that those in the target audience who see the poster could realistically miss the intended message.

The evaluators came to this realization during the detailed scoring process. Every time a score was discussed, the scorers had to remind themselves of the intended message for this product. In many cases, their first response was not exactly correct. The main problem was that there was no direct statement of the message. In this

case, the CLF sympathizers were supposed to get the message that giving food to the CLF in exchange for vouchers would not be in the best interests of their family. Because of the scoring process, the scorers realized that the minimum realistic number of target audience members that get the intended message could be zero. This violation drove the overall value to zero. The cost of Voucher is comparable to the better alternatives. However, the box indicates that not only is Voucher the worst alternative in the set, but it also has the potential for providing no value.

Summary and Conclusions

There has been a clear demonstration of the potential for using Value-Focused Thinking and multi-objective decision analysis as tools for evaluating PSYOP products. The notional scenario and five products evaluated demonstrated the potential power of this model to provide a quantitative analysis and evaluation of PSYOP products – for the first time ever.

Since PSYOP goals, objectives, and preferences can change dramatically in

different scenarios and under different commanders, the model we developed needed to be not only doctrinally and operationally sound but flexible so that a complete value model would not have to be developed for each scenario or new commander. We chose to base the hierarchy on doctrine and develop the measures using a wide variety of experts. The flexibility was added using thresholds within the measures to reflect the important levels of each measure where value jumps occur. These may change due to a different scenario or commander and we can evaluate these inflection points easily with a minimum number of elicitation questions. As shown in the description of the multi-objective function, we added another level of flexibility that allows a critically low level on an important measure to drive an alternative's value to zero. These indicator variables allow the value model to maintain its mathematical rigor and its simple additive form while reflecting the commander's strong preferences – something critical to the acceptance of the model.

Such an evaluation can aid in screening choices prior to development and can serve as a final check before the PSYOP products are released. The value model also can serve as a tool to help change the PSYOP operator's paradigm. Instead of evaluating a single product for a single objective, the value hierarchy highlights the theoretical value of considering the effect of all eight objectives when considering a PSYOP product.

Recommendations for Future Research

The Opposition PSYOP model developed in this research lends itself to evaluating PSYOP products against the opposition. The next step in this research is to broaden the scope from opposition only to all players in a scenario. This would require the identification of objectives, along the

lines of the eight presented in this study, for other target groups or audiences. An initial look at what these objectives might be has already been completed and the data is available. The sensitivity of some of these objectives restricts their release to those individuals with For Official Use Only clearance. This would not require a great deal of effort because the same nine measures used in this research could be carried over.

The second area for further research generated by this study deals with the measures themselves. This was the first effort to attach quantified measures to the area of PSYOP. Being the first effort, there were many difficulties in defining and quantifying each measure. An effort to further refine the single dimensional value functions should be undertaken. In particular, attention should be addressed to the measure for a medium's timing and percentage of window susceptibility used. The definition of the window of susceptibility was left up to the discretion of the scorers and exactly how much of the window was used was not fully clarified. Clarifying the window of susceptibility presents a difficult challenge. Answering the question, "when are they going to be susceptible enough?" requires a great deal of knowledge of the audience. Further, deciding what it means to cover a part of that window depends on how the window is defined.

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APPENDIX A

PSYOP Product Descriptions

Product Descriptions

The team of PSYOP experts selected and modified five products to be evaluated using the value model. All five products were originally developed as part of the course work for the POOC. These five products were specifically selected since they represented the range of typical PSYOP products.

The potential benefits of using the values identified by the model from this study were not incorporated in the product development. The current planning process starts with a particular objective and target audience identified. A product is then developed using the commander's approved themes.

Mimicking the way products are currently developed, the study's PSYOP experts selected five products that were narrowly focused on the reduction of internal support for the insurgent CLF. The five products developed were denoted "Snake In the Garden Leaflet," "Snake in the Garden Radio Broadcast," "Red Autumn Radio Broadcast," "1-800 Squeal Loudspeaker," and "Can't Eat Paper Poster" (voucher).

Snake in the Garden Leaflet

This leaflet will be distributed by a combination of United States Army helicopter air drops and maneuver units already in the area. After further coordination, the leaflets will be target dropped over known gathering places in the rural areas. The leaflet is presented in Figure A-1. Its primary intended message is that the United States and the GOC are allies that want what is best for Cortina and its people. The primary target audience considered during the development was the civilians of Cortina that are predisposed to be sympathetic to the CLF. The symbols used are the official birds of the United States (the bald eagle) and Cortina (the

falcon). They are sitting together on the fence to show the friendship between the two nations. The snake being driven from the garden was chosen to represent the PDRA because of the Christian background of the Cortinians. It should be perceived as evil being driven out of the garden.

Snake in the Garden Broadcast

This product will be a radio broadcast verbally describing the leaflet. The target audience, symbol, and message are the same as that of the leaflet. Local radio stations will be used to broadcast the description. A respected member of the local populace will be used as the voice; however, the fact that the United States is behind the broadcast will be apparent to the audience.

Red Autumn Radio Broadcast

Red Autumn was an incident where the CLF organized an activity that lead to the slaughter of many innocent Cortinian civilians. The script contained in Figure A-2 will be broadcast over the local radio using local radio personalities. The United States will not be identified as being the original source of the script. The intended message is that the CLF is a threat to their heritage and their proud nation. The intended target audience will be CLF sympathizers. The symbol, Red Autumn, is the massacre of innocent civilians by the CLF that demonstrates that the CLF is a threat and not fit to lead the nation their ancestors and families have gained for the people of Cortina.

1-800 "Squeal" Loud Speaker Broadcast

The fourth product evaluated in this analysis is the 1-800 Squeal Loud Speaker broadcast. Standard loud speaker systems will be used to transmit a series of three messages, progressively detailed, in the areas where CLF supports are thought to be living. The three messages are presented in

Figure A-3. Three messages are used for variety in the hopes of holding the attention of the audience and to build off of each other. The intended message of the broadcast is that turning in CLF members to the authorities will help protect you and your family.

Can't Eat Paper Poster (Voucher)

There is a documented history of the CLF issuing vouchers to the Cortinian people for food received or taken from the people. The vouchers may be redeemed for goods after the current government of Cortina is overthrown and the CLF is in power. The symbol contained on the poster is a picture of a family sitting down for the evening meal with vouchers instead of food on their plates. The theme written on the poster is that you can not eat paper. The weather, which can be seen through a window of the family's dining room, will show a very dark and gloomy day. An actual graphic of the poster was not available. The posters will be hung in the markets, public gather places, public buildings, and transportation facilities. The intended target audience is the Cortinian civilians that may be providing food and support to the CLF. The intended message is that giving food to the CLF is like throwing it away.

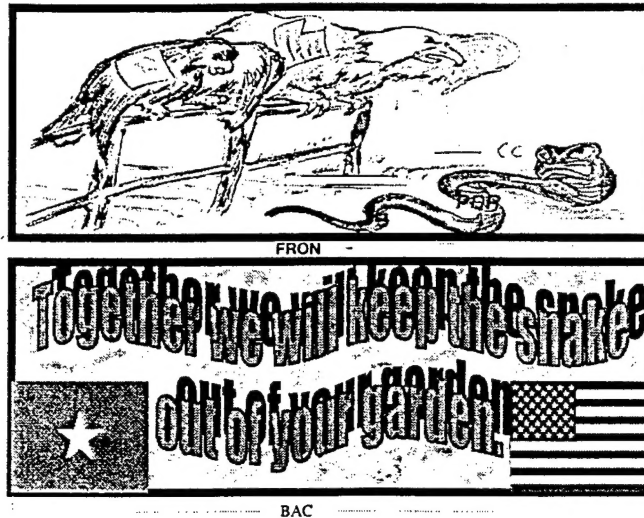


Figure A-1. Snake In the Garden Leaflet

- Noble people of Cortina, the road to the freedom that we enjoy began over 100 years ago. We have enjoyed much prosperity since then and watched our nation grow, as our children and culture have grown
- However, many of our fathers, mothers, sisters and brothers, as well as children of Cortina have given their lives for the freedoms that we enjoy. Many of these lives have been lost at the hands of the CLF, most recently during the treachery we know as "Red Autumn." The CLF killed our loved ones in acts of brutality and violence in the name of their so-called "liberation." How does one liberate another by killing their families? Cortinians will never forget the pain and anguish caused by "Red Autumn." The pain must end.
- Only we can end the constant fear imposed by the CLF. Only we can secure our future. Only we can stop the CLF. But how can we do this? By abandoning the empty promises of the CLF and their masters. By informing on their activities and halting the transfer of food to their cause. We can and must succeed. Our future depends upon it. Together, Cortinians can forge a bright future for our children and reclaim our place as the star of the Atlantic.

Figure A-2. Script for Red Autumn Radio Broadcast

-Message 1

For your own security and safety, please report all movements and activities of the CLF

-Message 2

Only by reporting the insurgent activities and movements of the CLF, can you help protect your families. Should you hear about or see an action by the CLF against the govt and people of Cortina, please go immediately to the nearest Cortinian police station or Coalition forces personnel and report what you have seen or heard. You will be listened to immediately and treated with respect.

-Message 3

Be a hero and save lives by exposing the criminal plans of the CLF. If you cannot contact Cortinian police or Coalition forces, or you do not wish to speak with them face to face, please call 1-800-STOP CLF. Your anonymity is assured and your bravery is appreciated.

Figure A-3. 1-800 Squeal Message Text

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Psychological Operations - targeting not just the physical capabilities of an opponent but the psychological dimensions as well -- is a key military consideration. The direct and almost instantaneous communication available with today's technology provides an even greater potential for exploiting the vulnerabilities and susceptibilities of the mind of the adversary. This effort develops a model for evaluating PSYOP products using multi-objective decision analysis and Value Focused Thinking. The model allows the Psychological Operations Detachment Commander to quantify the potential of proposed PSYOP products in meeting the psychological objectives.

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